

REMARKS

Claims 1-8 and 21-26 are pending. Claims 9-20 have been cancelled without prejudice or disclaimer as to Applicants' right to pursue the subject matter of claims 9-20 in a continuing application. Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Entry of this amendment is respectfully requested as no new search is required and it places the application in condition for allowance or at least in better form for appeal.

Priority Information

The Office Action acknowledges Applicants' claim for foreign priority under 35 U.S.C. § 119(a)-(d) but indicates that because the oath and priority document indicate 6/12/00 as the filing date, priority cannot be based on the foreign application because it is allegedly more than twelve months before the November 27, 2001 U.S. filing date of the instant application. Applicants respectfully disagree. The front cover of the priority document indicates that the date of application is 2000-12-6, which is to be read in the conventional Japanese system of year/month/day, i.e., December 6, 2000. Additionally, Applicants submit that the oath does indicate that the filing date of the priority document is December 6, 2000. As indicated above the date, the format of the date is day/month/year filed. Therefore, Applicants submit that the priority document was filed on December 6, 2000 and therefore priority can be claimed based on the foreign application. Accordingly, Applicants respectfully request that this objection be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

A. Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) over Lee (U.S. Patent No. 5,959,322) in view of Malik et al (U.S. Patent No. 6,294,423). Applicants respectfully traverse this rejection.

Claim 1 recites, in part, a semiconductor device which includes an element substrate with a groove formed therein with a depth extending from a top surface of the semiconductor layer into the dielectric film. The groove is formed to have an increased width portion in the dielectric film, the dielectric film of the increased width portion is receded laterally as to expose a bottom surface of the semiconductor layer and such that the width of the groove in the dielectric film is greater than that of the groove in the semiconductor layer. Additionally, the semiconductor device includes an impurity diffusion source buried in the increased width portion of the groove to be contacted with the bottom surface of the semiconductor layer.

The Office Action alleges that Lee teaches an element substrate with a groove formed therein with a depth extending from top surface of the semiconductor layer into the dielectric film. However, Lee does not teach such a feature. Lee teaches that (figure 2, column 4, lines 15-20) that a trench isolation region 16 is formed in a semiconductor substrate 10 and that a dielectric film 20 is formed on an inner wall of the trenches. Accordingly, Lee does not teach a groove which extends into the dielectric layer, as recited in claim 1.

Additionally, the Office Action alleges that Lee teaches an impurity diffusion source buried in the groove to be contacted with the bottom surface of the semiconductor layer. However, Lee does not teach such a feature. Lee teaches that an impurity region 32 is formed on the top surface of the semiconductor substrate (see Figure 2, column 4, lines 35-38). Accordingly, Lee does not teach that an impurity layer is formed to be in contact with the bottom surface of the semiconductor layer, as recited in claim 1.

The Office Action admits that Lee does not teach that the groove has an increased width portion which is receded laterally as to expose a bottom surface of the semiconductor layer and such that the width of the groove in the dielectric film is greater than that of the groove in the semiconductor layer. The Office Action relies on Malik as allegedly teaching this feature. However, Malik does not teach such a feature. Malik teaches that (Figure 2, column 4, lines 20-30) the widths A and B of each individual trench 30 and 32 is different. Malik does not teach that the groove has an increased width portion which is receded laterally as to expose a bottom surface of the semiconductor layer and such that the width of the groove in the dielectric film is greater than that of the groove in the semiconductor layer. Lee does not remedy the deficiencies of Malik and Malik does not remedy the deficiencies of Lee. Accordingly, no combination of Lee and Malik teach or suggest the claimed semiconductor device of claim 1.

Claim 2 is believed allowable for at least the same reasons presented above with respect to claim 1 by virtue of its dependence upon claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

B. Claim 3 was rejected under 35 U.S.C. § 103(a) over Lee in view of Malik and further in view of Applicants Prior Art Figure (APAF). Applicants respectfully traverse this rejection.

Claim 3 is believed allowable for at least the same reasons presented above with respect to claim 1 by virtue of its dependence upon claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

C. Claims 6-8 were rejected under 35 U.S.C. § 103(a) over Lee in view of Malik and APAF and further in view of Hieda et al. (U.S. patent No. 5,508,541). Applicants respectfully traverse this rejection.

Claims 6-8 are believed allowable for at least the same reasons presented above with respect to claim 1 by virtue of their dependence upon claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

D. Claim 21 was rejected under 35 U.S.C. § 103(a) over Lee in view of Malik and further in view of Applicant's Prior Art (APA). Applicants respectfully traverse this rejection.

Claim 21 is believed allowable for at least the same reasons presented above with respect to claim 1 because claim 21 recites, in part, a semiconductor device which includes an element substrate with a groove formed therein with a depth extending from a top surface of the semiconductor layer into the dielectric film, that the groove is formed to have an increased width portion in the dielectric film, the dielectric film of the increased width portion is receded laterally as to expose a bottom surface of the semiconductor layer and such that the width of the groove in the dielectric film is greater than that of the groove in the semiconductor layer, and that the semiconductor device includes an impurity diffusion source buried in the increased width portion of the groove to be contacted with the bottom surface of the semiconductor layer. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

E. Claims 24-26 were rejected under 35 U.S.C. § 103(a) over Lee in view of Malik and APA and further in view of Hieda. Applicants respectfully traverse this rejection

Claims 24-26 are believed allowable for at least the same reasons presented above with respect to claim 21 by virtue of their dependence upon claim 21. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

Conclusion

Applicants appreciate the Examiner's indication that claims 4, 5, 22, and 23 contained allowable subject matter and would be allowable if rewritten in independent for. However, in view of the foregoing, all the claims are now believed to be in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best

resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Please charge any fees associated with the submission of this paper to Deposit Account Number 03-3975 under Order No. 44020/284032. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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